

METHOD OF FORMING STRAINED SILICON ON INSULATOR

Abstract

A SOI structure (10) and a method for its fabrication, in which a strained silicon layer (12) lies directly on an insulator layer (14), contrary to the prior requirement for strained-Si layers to lie directly on a strain-inducing (e.g., SiGe) layer. The method generally entails the forming a silicon layer (12) on a strain-inducing layer (22) so as to form a multilayer structure (18), in which the strain-inducing layer (22) has a different lattice constant than silicon so that the silicon layer (12) is strained as a result of the lattice mismatch with the strain-inducing layer (22). The multilayer structure (18) is then bonded to a substrate (24) so that an insulating layer (14) is between the strained silicon layer (12) and the substrate (24), and so that the strained silicon layer (12) directly contacts the insulating layer (14). The strain-inducing layer (22) is then removed to expose a surface of the strained silicon layer (12) and yield a strained silicon-on-insulator structure (10) that comprises the substrate (24), the insulating layer (14) on the substrate (24), and the strained silicon layer (12) on the insulating layer (14). As a

result, the method yields a strained silicon-on-insulator (SSOI) structure (10) in which the strain in the silicon layer (12) is maintained by the SOI structure (10).